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**BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES**

Application Number: 09/825,582
Filing Date: April 03, 2001
Appellant(s): REZNEK, STEVEN R.



Luke A. Kilyk
For Appellant

**EXAMINER'S ANSWER**

This is in response to the appeal brief filed July 7, 2004, and the supplemental appeal brief filed August 18, 2004

A statement identifying the real party in interest is contained in the brief.

*(1) Real Party in Interest*

A statement identifying the real party in interest is contained in the brief.

*(2) Related Appeals and Interferences*

The brief does not contain a statement identifying the related appeals and interferences which will directly affect or be directly affected by or have a bearing on the decision in the pending appeal is contained in the brief. Therefore, it is presumed that there are none. The Board, however, may exercise its discretion to require an explicit statement as to the existence of any related appeals and interferences.

*(3) Status of Claims*

The statement of the status of the claims contained in the brief is correct.

*(4) Status of Amendments After Final*

The appellant's statement of the status of amendments after final rejection contained in the brief is correct.

*(5) Summary of Invention*

The summary of invention contained in the brief is correct.

*(6) Issues*

The appellant's statement of the issues in the brief is substantially correct. The changes are as follows: Part B is moot. On reconsideration, the rejection of the claims 1, 2, 10, 12 and 21-28 in view of United States Patent No. 5,908,896, is withdrawn.

*(7) Grouping of Claims*

The rejection of claims 1-3, 7-14 and 17-29 stand or fall together because appellant's brief does not include a statement that this grouping of claims does not stand or fall together and

reasons in support thereof. See 37 CFR 1.192(c)(7). There is only one ground of rejection pending. Merely pointing out differences in what the claims cover is not an argument as to why the claims are separately patentable.

***(8) Claims Appealed***

A correct copy of appealed claims appears on page A1 of the Appendix to the appellant's brief.

***(9) Prior Art of Record***

Kienle, H. Von, "Ullmann's Encyclopedia of Industrial Chemistry" Vol. A.5 (1996), pp 124-132

Lewis, Richard J., "Hawley's Condensed Chemical Dictionary" Twelfth Edition (1993) pp 982 and 218.

***(10) Grounds of Rejection***

The following ground(s) of rejection are applicable to the appealed claims:

***Claim Rejections - 35 USC § 102-Maintained***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claim 1-3, 7-14, and 17-29 are rejected under 35 U.S.C. 102(b) as being anticipated Ullmann's Encyclopedia of Industrial Chemistry. (Ullmann).

As to claims 1 and 10, disclosing a method of making carbon foam comprising pyrolizing a mixture in the presence of at least one oxidizing source. Foam is construed in light of the

specification. Page 126 in column 2 of Ullmann discloses the formation of carbon foam (activated carbon). The oxidizing source is disclosed as oxygen. Appellant has failed to distinguish the method of Ullmann from the claimed method.

As to claims 2 and 3 disclosing that a fuel source is present and that the pyrolizable substance comprises coal, the indicated passage discloses coal and the coal serves as both the coal and the the fuel source.

As to claims 7, 8, and 9 disclosing that the fuel source is gaseous, the coal produces carbon monoxide (1000C), which is flammable and gaseous, and a natural gas. The coal inherently contains hydrocarbons. The same is disclosed by Ullmann see e.g. page 128 section 4.2.3.

As to claims 18 and 19, disclosing that the at least pyrolizable material is introduced by being dispersed in a carrier stream. The same is disclosed at 4.2.1 page 127 starting at first paragraph of the first column, disclosing that in the production of activated carbon numerous different systems may be employed including fluidized bed reactors. Ullmann goes on to disclose particle size is a factor that is determinative in system selection. Page 126 also talks about pneumatic delivery, and the need for an inert environment.

As to claim 11, disclosing that the oxidizing material is present in an amount which is between 0.05 and 0.75 of the amount needed to combust completely the pyrolizable material and fuel; and the fuel is present in an amount such that its complete combustion consumes between 0 and 100% of the oxidizable material. Since the complete combustion of the fuel may consume

between 0 and 100% of the oxidizable material, and since the oxidizing material is present in an amount which is between 0.05 and 0.75 of the amount needed to combust completely the pyrolizable material and fuel, it follows that figure 21, disclosing oxygen in concentrations between about 0.5% and about 0.75 percent, properly anticipates that claim.

However, it has been construed in light of page 4 line 21 *et seq.* of the specification. That paragraph discloses that the oxidizing source should be sufficient to at least partially combust the fuel but the amount of oxidizing source should be controlled such that the pyrolizable material does not completely combust or burn the pyrolizable material. The amount of oxidizing material needed is in the range of 0.05 to 0.75 of the theoretical amount needed to completely burn all of the fuel and combustible material. In the case where a separate fuel is used, the amount of fuel is such that the fuel combustion consumes between 0 and 100% of the oxidizing material. Seemingly, if the fuel consumes 0% it is no longer fuel. Is there another explanation?

As to claim 12, disclosing that the pyrolizable material, fuel source when present, and oxidizing source are introduced sequentially in any order. Ullmann discloses an order in the reference see e.g. 4.2.4.2 page 131, as such the claim limitation is met.

As to claim 13, disclosing that the pyrolizable material, fuel source, and oxidizing source are added as a mixture, Ullmann discloses at 4.1 page 125 that the activated carbon includes not only carbon but also small amounts of oxygen and hydrogen. Ullmann goes on to disclose that the materials "are sometimes derived from the raw material" or they can be formed during or after

the activation process by the action of air or water vapor. Thereafter Ullmann further goes on to enumerate a situation where water might be added to the carbon in a pretreatment step.

As to claim 14, disclosing that at least one pyrolizable material is introduced into a combustion chamber by being dispersed in said fuel source when present or said oxidizing source or both. Throughout the literature and in Ullmann, the pyrolizable material is disclosed to serve in a dual role, fuel source and pyrolizable material see e.g. 4.2.3 on page 128. Also see comments with respect to claim 13 above.

As to claim 17, further limiting claim 2 and disclosing that the fuel source and said oxidizing source are introduced into a combustion chamber prior the introduction of at least one pyrolizable material and wherein said fuel source and oxidizing source are ignited prior to introducing said at least one pyrolizable material into said chamber. The rotary kiln of figure 23, and relevant associated text in Ullmann disclose that the steam, gas, and air are fed into the kiln and the ignition occurs within the kiln. The carbon is added to the hot kiln and is gradually moved from the coal inlet to the activated carbon outlet. Thus, the pyrolizable material is added after the fuel source and said oxidizing source.

As to claim 18, disclosing that at least pyrolizable material is introduced by being dispersed in a carrier stream. This technique is inherent in the fluidized bed furnace disclosed by Ullmann in figure 25 and relevant associated text. The dispersion of the powdered carbon can be readily prepared by metering powdered coal and required solvent into a suitable vessel equipped with

mixing means and stirring the mixture until a uniform suspension is obtained. The resulting suspension is thereafter conveyed to the furnace by pumping. The activating gases are disclosed to introduced into the spaces between the fluidized layers and, more importantly into the circulatory system. See page 130 first full paragraph.

As to claims 19 and 20, further limiting claim 18 and disclosing that the carrier stream is an inert gas. The specification refers to a "neutral gas", Ullmann refers to an "oxygen free gas" which is contextually inert. See e.g. 4.2.5 on page 132. Ullmann also disclose a first step using *inter alia* an oxygen containing gas. See page 130 first full paragraph and discussion with respect to claim 18 above.

As to claims 21, disclosing that said pyrolizing occurs at a temperature from about 300C to about 1600C. As an initial matter this is a fact that could be Officially noticed, nonetheless, 4.2.1 under the subheading discloses 800-1000C, additional temperature ranges are disclosed in figure 24. Under section 4.2.4.2 beginning on page 131, a carrier gas is disclosed. The carrier gas is disclosed as a "mild oxidizing agent". Further on the reference discloses utilizing oxygen and air to aid in the gas activation.

As to claims 22 and 23, disclosing the carbon foam formed by claims 1 and 2, since the same steps are disclosed, inherently the same product would result.

As to claim 24, 25, and 26, further limiting claim 22, and disclosing that the carbon form having cells bordered by thin sheets, windows, struts, or combinations thereof. As an initial matter, it is assumed Appellant intended "foam" not "form", further it is presumed, because the claim was not corrected, that Appellant failed to note the tacit request to clarify the issue. The foam cells inherently have a relatively large surface area per given volume, usually order 1000 $m^2$/gram. Inherent in such large surface areas are "thin sheets" and openings between the cells etc. The structure results from many well-documented phenomena including carbon source. See e.g. page 131, column 2, last full paragraph.

As to claims 27 and 28 further limiting claim 22 and disclosing that the carbon foam is a "thermal insulating material." The material properties of the foam are, of necessity, identical. Consequently, the disclosed resulting product is similarly a "thermal insulating material" and is rigid. See page 127, first paragraph, disclosing that the finished product may take many forms including "molded shapes."

As to claim 29 further limiting claim 22 and disclosing a polymer compound including the carbon foam, or fragments thereof. The same is disclosed at 4.2.6. disclosing that the activated carbon powder is used in mineral oil, which is polymeric in the sense of repeating units.

On reconsideration, the rejection of the claims 1, 2, 10, 12 and 21-28 in view of United States Patent No. 5,908,896, is withdrawn. Appellants' argument that the optional claim language only modifies the fuel source, and most importantly, the argument that Mayer et al. fail to disclose the

claimed pyrolizable material, are deemed persuasive. The Mayer (USPN 5,908,896) anticipation rejection in withdrawn.

***(11) Response to Argument***

Appellant argues that making activated carbon "is not at all the same" as pyrolyzing a material to make carbon foam. Appellant does not offer any explanation, or provide any evidence of what constitutes "pyrolysis". Hawley's Condensed Chemical Dictionary defines pyrolysis as "Transformation of a compound into one or more other substances by heat alone, i.e. without oxidation." The definition for "activated carbon" includes:

> The carbon is obtained by destructive distillation of ... carbonaceous material. It is "activated" by heating to 800-900C with steam or carbon dioxide, which results in a porous internal structure (honeycomb-like). The internal surface area of activated carbon is averages about 10,000 square feet per gram. The density is from 0.08 to 0.5.

The "destructive distillation" is the transformation of the carbonaceous material. The resulting "porous internal structure" and "honeycomb-like" structure comport with accepted definitions of foam. Appellant discloses, at page 2 of the specification, "a feature of the present invention is to provide carbon foams preferably having high surface areas as well as high structure."

Appellant argues that Ullmann fails to teach the oxidizing source (Appeal Brief at page 8 Para. 3). Appellant's assertion ignores the fact that Ullmann explicitly teaches that steam and carbon dioxide, both behave as "mild oxidizing agents at 800-1000C" column 1, page 131 (see also Final Rejection page 8 paragraph 18). Ullmann discloses an operating temperature of 800-1000C, therefore, the oxidizing agent is present. It is also noted that oxygen and air are

introduced to "burn off" the gases produced during the activation of the carbon. See Ullmann at Page 131 column 2.

Ullmann teaches that coal is the starting material, Ullmann at column 2, section 4.2.1. Appellant indicates that that the present application teaches examples of an oxidizing source. Ullmann teaches the same oxidizing source, air, and oxygen at page 131 column 2. As must be the case, with pyrolysis, the off-gas of the starting material is what is oxidized, not the starting material. If the starting material (say coal or sugar) is heated to 1800C, in the presence of an oxidizing source, such as air or oxygen, the material would catch on fire. This is explicitly warned against in the specification at page 4. Like Ullmann, the specification warns that the oxidizing source "should be controlled" to protect against the burning of the "pyrolizable material."

At page 9 of the Appeal Brief, Appellant persists in arguing, "gases containing combined oxygen cannot be used to combust fuel." (Emphasis original). In reality, claim 1 does not require that the claimed "oxidizing source" be capable of combusting fuel. Like Ullmann, the appellant may want to combust the fuel, but needs to exercise caution to avoid combusting the material to be pyrolized. Combustion of the pyrolizable material is not pyrolysis. It is noted that Ullmann explicitly discloses that small amounts of air may be used with the steam and carbon dioxide if larger pore sizes are desired. See last full paragraph of column 2, page 131. Ullmann however warns of the risk of "uncontrolled combustion".

At page 10 of the Appeal Brief appellant remarks: "it is important for the Board to appreciate that when fuel consumes 0% of an oxidizable material, since the oxidizing material is still present, the reaction would be an oxygen rich reaction." (Emphasis original). This examiner has never heard of an "oxygen rich" pyrolysis. Pyrolysis is, by definition, a non-oxidizing reaction. Heating a pyrolizable material to 300C-1600C (572F-2912F) in "oxygen rich" environment would burn the pyrolizable material.

At page 11, in the first paragraph appellant argues that the presence of steam and carbon dioxide create a "completely different" environment than the environment set forth in claim 1, which is an outright pyrolizing of the material the presence of at least one oxidizing source. Appellant continues "[n]eedless to say, the steam and carbon dioxide would hinder or prevent any pyrolizing." It is unclear what the basis is for this statement. The specification at page 4, like Ullmann, warns that the oxidizing source "should be controlled" to protect against the burning the "pyrolizable material."

At page 11, Appellant argues that the Ullmann's disclosure of providing at least one pyrolizable material in the present of at least one oxidizing source, wherein the pyrolizable material, comprises coal should not be treated as an anticipatory teaching. To clarify, Ullmann teaches the material, the oxidizing source, and the claimed temperature, but fails to use the magic word "pyrolize" and therefore the claim is not anticipated. This examiner believes that if the reference teaches each and every step of the claim invention it is irrelevant if the process is called a "preoxidation step" or "pyrolizing". The steps are the same, the substances are the same, the

temperatures are the same, it follows that the result is the same, or appellant is not disclosing a critical step.

Appellant separately argues claims 2 and 7-9.

The claim limitations are found in the reference. Specifically, page 128 in column 1 discloses the claimed steps, including the addition of the fuel. The process steps are identical, however this is disclosed as a pretreatment step. Seemingly, Appellant's method is a pretreatment step too. The heating of the coal, in the absence of oxygen, results in the formation of vapors comprising the elements of the coal.

Appellant separately argues claim 10.

The air and oxygen are disclosed as a means to burn the injected fuel or the locally produced fuel. Ullmann page 131 column 2.

Appellant separately argues claim 11.

The statement the Ullmann does not teach or suggest "pyrolizing with any oxidizing source at any level" is at variance with the explicit teaching of Ullmann at page 131, under the heading of "Gas Activation". Additionally, the suggestion that the pyrolizable material itself cannot provide the oxygen is not a limitation found in the claims. The coal or other pyrolizable material can supply the oxidizing material. Since the complete combustion of the fuel may consume between 0 and 100% of the oxidizable material, and since the oxidizing material is present in an amount which is between 0.05 and 0.75 of the amount needed to combust completely the pyrolizable

material and fuel, it follows that figure 21, disclosing oxygen in concentrations between about 0.5% and about 0.75%, properly anticipates the claim.

Appellant separately argues claim 13.

Appellant argues "the Examiner cannot take the position that the activated carbon serves as the pyrolizable material as well as the fuel source at the same time." Appellant's position does not reflect the position of the Office. Coal serves as the pyrolizable material. The activated carbon is the carbon foam. Furthermore, the pyrolizable material, fuel source, and oxidizing source are added as a mixture. Ullmann discloses at 4.1, starting at page 125 that the activated carbon includes not only carbon but also small amounts of oxygen and hydrogen. Ullmann goes on to disclose that the materials "are sometimes derived from the raw material" or they can be formed during or after the activation process by the action of air or water vapor. Thereafter Ullmann further goes on to enumerate a situation where water might be added to the carbon in a pretreatment step.

Appellant separately argues claim 14.

The pyrolizable material is dispersed in, at least an oxidizing source. See page 131 paragraph 4.2.4.2, under the heading Gas Activation. Oxidizers (CO2 and steam) are introduced with the pyrolizable material. Additionally, throughout the literature and in Ullmann, the pyrolizable material is disclosed to serve in a dual role, fuel source and pyrolizable material--see e.g. 4.2.3 on page 128.

Appellant separately argues claim 17.

The argument that "gas activation does not involve pyrolysis " has been discussed. Pyrolysis is the same as gas activation of a pyrolizable material. In any case, it is the same steps, with the same material as claimed. Gas activation is not the activation of gas; it is the activation of the pyrolizable material. The rotary kiln of figure 23, and relevant associated text in Ullmann disclose that the steam, gas, and air are fed into the kiln and the ignition occurs within the kiln. The carbon is added to the hot kiln and is gradually moved from the coal inlet to the activated carbon outlet. Thus, the pyrolizable material is added after the fuel source and said oxidizing source. Appellants point to Ullmann's teaching that "oxygen and air are unsuitable" as activating gases. They are also unsuitable as pyrolizing gases. Oxygen and air would result in the combustion of the pyrolizable material. Appellant thereafter asserts, incorrectly, steam activates the coal. The coal is activated by a combination of factors, most important of which is heat in the absence of sufficient oxygen to sustain combustion.

Appellant separately argues claims 18-20.

As to claims 18 and 19, disclosing that the at least pyrolizable material is introduced by being dispersed in a carrier stream. The same is disclosed at 4.2.1 page 127 starting at first paragraph of the first column, disclosing that in the production of activated carbon numerous different systems may be employed including fluidized bed reactors. Ullmann goes on to disclose particle size is a factor that is determinative in system selection. Page 126 also talks about pneumatic delivery, and the need for an inert environment. As to claim 20, disclosing that the carrier stream is an inert gas. The specification refers to a "neutral gas", Ullmann refers to an "oxygen free

gas" which is contextually inert. See e.g. 4.2.5 on page 132. Ullmann also disclose a first step using *inter alia* an oxygen containing gas. See page 130 first full paragraph and discussion with respect to claim 18 above.

Appellant purports to separately argue claims 22 and 23.

Appellant argues, "the process of the claimed invention is quite different from Ullmann, and clearly a different product would result." The statement is without support. The process is identical: the claim requires a pyrolizable material in the presence of an oxidizing source. The claim reads on a coal-fired furnace and on the carbon activation taught in Ullmann. Appellant's makes the unsupported statement: "clearly a different product would result" it is not clear why a different product would result in the method is wholly identical.

Appellant separately argues claims 24-29

As to claim 24, 25, and 26, further limiting claim 22, and disclosing that the carbon form having cells bordered by thin sheets, windows, struts, or combinations thereof. As an initial matter, it is noted that Appellant intended "foam" not "form". The foam cells inherently have a relatively large surface area per given volume, usually order 1000 $m^2$/gram. Inherent in such large surface areas are "thin sheets" and openings between the cells etc. The structure results from many well-documented phenomena including source of the carbon (coal, peat, coconut etc.). See e.g. page 131, column 2, last full paragraph. As to claims 27 and 28, further limiting claim 22 and disclosing that the carbon foam is a "thermal insulating material". The material properties of the foam are, of necessity, identical. Consequently, the disclosed resulting product is similarly a

"thermal insulating material" and is rigid. See page 127, first paragraph, disclosing that the finished product may take many forms including "molded shapes." As to claim 29 further limiting claim 22 and disclosing a polymer compound including the carbon foam, or fragments thereof. The same is disclosed at 4.2.6.

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

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August 23, 2004

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Enclosure: Appendix-- Lewis, Richard J., "Hawley's Condensed Chemical Dictionary" Twelfth Edition (1993) pp 982 and 218.